TABLE Ia. DEVICE DESCRIPTORS 1/

JPL PART NUMBER ST12243-	MFR. PART NUMBER	GENERIC PART NUMBER	DEVICE TYPE 2/	PACKAGE STYLE 3/	ELECTRICAL PERFORMANCE CHARACTER-ISTIC	TERMINAL CONNECTIONS	ELECT-RICAL TEST REQ'MNTS 4/	BURN-IN CIRCUIT 4/
U02953ADR	LP2953A	2953	02 ADD-ON	GDIP1-T16 (16-PIN DIP)	TABLE Ib	FIG. 1	TABLE II	FIG. 2

NOTES:

1/ This drawing, in conjunction with CS515577 and Standardized Military Drawing (SMD) 5962-38705 Class S, imposes all requirements for procurement of these devices

2/ Refer to SMD 5962-38705.

3/ Refer to MIL-STD-1835.

4/ Screening shall be in accordance with SMD 5962-38705 Class S, except that Table II herein shall be substituted for Table II of SMD 5962-38705 Class S and SMD 5962-38705 Table III for device type02 add-on shall be the parameters from Table Ib. Electrical Performance Characteristics which have MIN and/or MAX LIMITS.

5. Each lot shall pass Group E, Subgroup 2 irradiation test to total irradiation dose (TID) of 100krads. The post-irradiation electrical test limits shall be those of Table III herein.

6. This standard takes precedence over documents referenced herein.

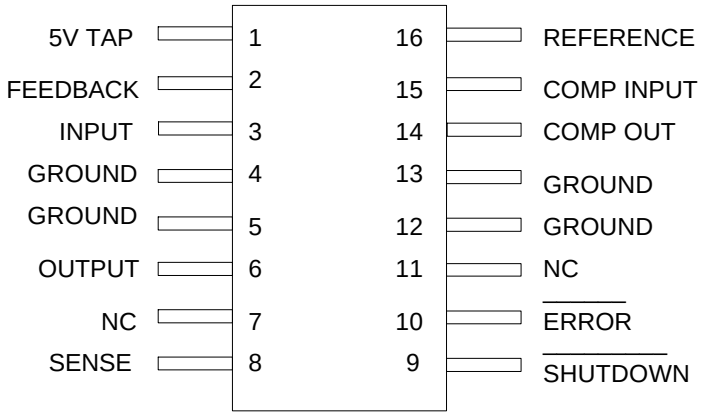

FIGURE 1. TERMINAL CONNECTIONS

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APPROVED SOURCE(S)

THE ITEM LISTED IN THE APPROVED SOURCE BLOCK AND IDENTIFIED BY VENDOR NAME, ADDRESS, AND PART NUMBER WILL BE EVALUATED AND TESTED BY THE JPL ELECTRONIC PARTS RELIABILITY SECTION OR ITS DELEGATED ALTERNATE BEFORE BEING APPROVED FOR USE. NON-JPL USERS SHALL CHECK WITH THE ELECTRONIC PARTS RELIABILITY SECTION ON THE STATUS OF THE PART'S APPROVAL BEFORE USING.

VENDOR PART NO	VENDOR	JPL PART NO

JET PROPULSION LABORATORY CALIFORNIA INSTITUTE OF TECHNOLOGY

CAGE NO 23835

Procurement specification: CS515577
Screening specification: ZPP-2073-GEN

TITLE: MICROCIRCUIT, LINEAR, VOLTAGE REGULATOR, LOW-DROPOUT, ADJUSTABLE, MICROPOWER

DETAIL SPECIFICATION

ST 12243

Custodian: Electronic Parts Reliability Section 514

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TABLE Ib. ELECTRICAL PERFORMANCE CHARACTERISTICS

Subgroup 3 testing is done at -40°C. Unless otherwise specified: V_{IN} = 6V, I_L = 1 mA, C_L = 2.2 µF, Feedback pin is tied to 5V Tap pin, Output pin is tied to Output Sense pin, V_{OUT} = 5V.

TEST	SYMBOL	CONDITIONS	GROUP A SUB-GROUPS	LIMITS		UNITS
				MIN	MAX	
OUTPUT VOLTAGE	V_O		1	4.975	5.025	V
			2,3	4.940	5.060	
		1mA ≤ I_L ≤ 250 mA	2,3	4.930	5.070	
OUTPUT VOLTAGE TEMP. COEFFICIENT	$\Delta V_O/\Delta T$	1/	1,2,3		100	ppm/°C
OUTPUT VOLTAGE LINE REGULATION	$\Delta V_O/V_O$	V_{IN} = 6V to 30V	1		0.1	%
			2,3		0.2	
OUTPUT VOLTAGE LOAD REGULATION 2/	$\Delta V_O/V_O$	I_L = 1 mA to 250 mA	1		0.16	%
		I_L = 0.1 mA to 1 mA	2,3		0.20	
DROPOUT VOLTAGE 3/	V_{IN} - V_O	I_L = 1mA	1		100	mV
			2,3		150	
		I_L = 50 mA	1		300	
			2,3		420	
		I_L = 100 mA	1		400	

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			2,3		520	
		I_L = 250 mA	1		600	
			2,3		800	
GROUND PIN CURRENT 4/	I_{GND}	I_L = 1 mA	1		170	µA
			2,3		200	
		I_L = 50 mA	1		2	mA
			2,3		2.5	
		I_L = 100 mA	1		6	
			2,3		8	
		I_L = 250 mA	1		28	
			2,3		33	
GROUND PIN CURRENT AT DROPOUT 4/	I_{GND}	V_{IN} = 4.5V I_L = 100 µA	1		210	µA
			2,3		240	
GROUND PIN CURRENT AT SHUTDOWN 4/	I_{GND}	5/	1		140	
THERMAL REGULATION	$\Delta V_O/\Delta P_D$	6/	1		0.2	%/W
CURRENT LIMIT	I_{LIMIT}	V_{OUT} = 0	1		500	mA
			2,3		530	
OUTPUT NOISE VOLTAGE (10 Hz TO 100kHz)	e_n	I_L = 100 mA C_L = 2.2 µF	1	TYPICAL: 400		µV RMS
		I_L = 100 mA C_L = 33 µF	1	TYPICAL: 260		
		I_L = 100 mA	1	TYPICAL: 80		

TABLE Ib. ELECTRICAL PERFORMANCE CHARACTERISTICS, CONTINUED

TEST	SYMBOL	CONDITIONS	GROUP A SUB-GROUPS	LIMITS		UNITS
				MIN	MAX	
		C_L = 33 µF 7/				
REFERENCE VOLTAGE	V_{REF}	8/	1	1.215	1.245	V
			2,3	1.205	1.255	
REFERENCE VOLTAGE LINE REGULATION	$\Delta V_{REF}/V_{REF}$	V_{IN} = 2.5V to 6V V_{IN} = 6V to 30V 9/	1		0.1	%
			2,3		0.2	
REFERENCE VOLTAGE LOAD REGULATION	$\Delta V_{REF}/V_{REF}$	I_{REF} = 0 to 200 µA	1		0.4	%
			2,3		0.6	
REFERENCE VOLTAGE TEMP. COEFFICIENT	$\Delta V_{REF}/\Delta T$	1/	1,2,3	TYPICAL: 20		ppm/°C
FEEDBACK PIN BIAS CURRENT	I_B(FB)		1		40	nA
			2,3		60	
OUTPUT "OFF" PULLDOWN CURRENT	I_O(SINK)	5/	1	30		mA
			2,3	20		
DROPOUT DETECTION COMPARATOR						

VENDOR PART NO	VENDOR	JPL PART NO

TABLE Ib. ELECTRICAL PERFORMANCE CHARACTERISTICS, CONTINUED

TEST	SYMBOL	CONDITIONS	GROUP A SUB-GROUPS	LIMITS		UNITS
				MIN	MAX	
OUTPUT "HIGH" LEAKAGE	I_{OH}	V_{OH} = 30V	1		1	µA
			2,3		2	
OUTPUT "LOW" VOLTAGE	V_{OL}	V_{IN} = 4V I_S(COMP) = 400 µA	1		250	mV
			2,3		400	
UPPER THRESHOLD VOLTAGE	V_{THR}(MAX)	10/	1	-320	-150	mV
			2,3	-380	-100	
LOWER THRESHOLD VOLTAGE	V_{THR}	10/	1	-450	-230	mV
			2,3	-640	-160	
HYSTERESIS	HYST	10/	1	TYPICAL: 60		mV
SHUTDOWN INPUT 12/						
INPUT OFFSET VOLTAGE	V_{OS}	(Referred to V_{REF})	1	-7.5	7.5	mV
			2,3	-10	10	
HYSTERESIS	HYST		1	TYPICAL: 6		mV
INPUT BIAS CURRENT	I_B	V_{IN}(S/D) = 0 to 5V	1	-30	30	nA

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VENDOR PART NO	VENDOR	JPL PART NO

TABLE Ib. ELECTRICAL PERFORMANCE CHARACTERISTICS, CONTINUED

TEST	SYMBOL	CONDITIONS	GROUP A SUB-GROUPS	LIMITS		UNITS
				MIN	MAX	
			2,3	-50	50	
AUXILIARY COMPARATOR						
INPUT OFFSET VOLTAGE	V_{OS}	(Referred to V_{REF})	1	-7.5	7.5	mV
			2,3	-10	10	
HYSTERESIS	HYST		1			mV
INPUT BIAS CURRENT	I_B	V_{IN}(COMP) = 0 to 5V	1	-30	30	nA
			2,3	-50	50	
OUTPUT "HIGH" LEAKAGE	I_{OH}	V_{OH} = 30V V_{IN} (COMP) = 1.3V	1		1	µA
			2,3		2	
OUTPUT "LOW" VOLTAGE	V_{OL}	V_{IN}(COMP) = 1.1V I_L(COMP) = 400 µA	1		250	mV
			2,3		400	

NOTES: 1/ Output or reference voltage temperature coefficient is defined as the worst case voltage change divided by the total temperature range.

2/: Load regulation is measured at constant junction temperature using low duty cycle pulse testing. Two separate tests are performed, one for the range of 100 µA to 1 mA and one for the 1 mA to 250 mA range. Changes in output voltage due to heating effects are covered by the thermal regulation specification.

3/: Dropout voltage is defined as the input to output differential at which the output voltage drops 100 mV below the value measured with a 1 volt differential. At very low values of programmed output voltage, the input voltage minimum of 2V (2.3V over temperature) must be observed.

4/: Ground pin current is the regulator quiescent current. The total current drawn from the source is the sum of the ground pin current, output load current, and current through the external resistive divider (if used).

5/: $V_{SHUTDOWN} \leq 1.1V$, V_{OUT} = 5V.

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SHEET 6

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TABLE Ib. ELECTRICAL PERFORMANCE CHARACTERISTICS, CONTINUED

TEST	SYMBOL	CONDITIONS	GROUP A SUB-GROUPS	LIMITS		UNITS
				MIN	MAX	

6/: Thermal regulation is the change in output voltage at a time T after a change in power dissipation, excluding load or line regulation effects. Specifications are for a 200 mA load pulse at V_{IN} = 20V (3W pulse) for 10 ms.

7/: Connect a 0.1 μF capacitor from the output to the feedback pin.

8/: $V_{REF} \leq V_{OUT} \leq (V_{IN} - 1V)$, $2.3V \leq V_{IN} \leq 30V$, $100\mu A \leq I_L \leq 250$ mA.

9/: Two separate tests are performed, one covering $2.5V \leq V_{IN} \leq 6V$ and the other test for $6V \leq V_{IN} \leq 30V$.

10/: Comparator thresholds are referred to a 5V output. To express the threshold voltages in terms of a differential at the Feedback terminal, divide by the error amplifier gain = V_{OUT}/V_{REF}.

11/: Electrostatic Discharge (ESD) rating is 2 kV using a Human body model, 200 pF discharged through 1.5 kΩ.

12/: Drive NOT-SHUTDOWN pin with TTL or CMOS-low level to shut regulator OFF, high level to turn regulator ON.

TABLE II. ELECTRICAL TEST REQUIREMENTS

TEST	SUBGROUPS (PER SMD 5962-38705, TABLE III)
PRE BURN-IN	1,7
POST BURN-IN	1,2,3,4,7
DELTA CALCULATIONS	1/
GROUP B END POINTS	1,2,3,4,7

NOTES: 1/: Parameter delta calculations shall be performed with reference to the previous respective electrical measurement. The parameter delta limits shall be: $\Delta I_{IND} \leq \pm 10\%$ or ± 5 μA, whichever is greater; $\Delta(V_{IN} - V_O) \leq \pm 10\%$ or ± 5 mV, whichever is greater. Devices with parameter delta calculations exceeding the parameter delta limits shall be rejected.

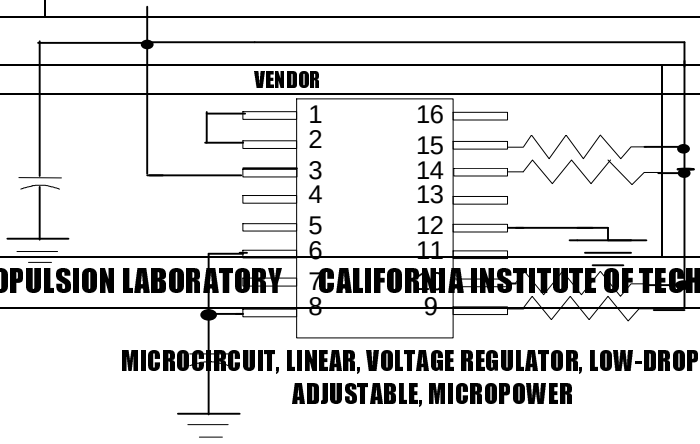
VENDOR PART NO	VENDOR	JPL PART NO

VCC +30 V ± 0.5V

Capacitors are 0.1 uF, 100 V; resistors are 100 Kohms, 1/4 watt.

FIGURE 2

TABLE III. POST-100KRAD-RADIATION ELECTRICAL TEST LIMITS AT 25°C



TEST	SYMBOL	CONDITIONS	LIMITS		UNITS
			MIN	MAX	
OUTPUT VOLTAGE	V_o	I_L =1mA,V_{IN}=6 V	4.957	5.031	V
GROUND PIN CURRENT	I_{GND}	I_L = 50 mA		2.67	mA
		I_L = 100 mA		6.43	
GROUND PIN CURRENT AT DROPOUT	I_{GND}	V_{IN} = 4.5V, I_L = 100µA		236	µA

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